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Signatures maintained on controlled copy in CAD QA office.

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## **1.0 Purpose**

Define a system for the review of technical changes to AGS drawings.

## **2.0 Policy**

An Engineering Change Notice (ECN) is required to initiate a revision to a drawing intended for use in the production/procurement of research apparatus. Approval, incorporation, and distribution of changes to technical specifications is the responsibility of the cognizant engineer (CE) or physicists.

## **3.0 References**

AGS-QAP-601, Preparation & Issuance of Engineering Drawings/Specifications

## **4.0 Definitions**

Configuration: The functional and/or physical characteristics of hardware, as set forth in technical documentation and achieved in an item or assembly.

Configuration Management: The systematic evaluation, approval (or disapproval), documentation, and implementation, of all approved changes in the configuration of a product intended for use in the manufacture or procurement of research apparatus

Production: Phase in the evolution of an item/assembly or process where completed engineering and manufacturing documentation and formal tools and fixtures are used to produce items/assemblies or processes of a mature design.

## **5.0 Review and Approval of Changes to Engineering Drawing**

5.1 Any individual recognizing the need for a drawing change may prepare an ECN. The originator is responsible for all required data, and for the submission of the ECN to the Design Group. Figure 1 represents a typical ECN.

5.2 ECN's shall state whether the change must be incorporated into items already produced/procured as well as items that are in the process of being produced or procured. This information will be entered in the "Description and Reason for Change" section on the ECN form.

5.3 The Design Group shall assign an ECN number to the request, and maintain an ECN log. Recorded in the log will be the date, the drawing number, and the name of the cognizant engineer or physicists.

5.4 The cognizant engineers will evaluate the ECN for the following:

- Impact on form, fit, and function
- Impact on tooling schedules, material, and costs
- Impact on cost, schedule and/or technical performance (i.e. performance, reliability, maintainability, availability, durability, interchangeability, systems interface, health or

safety)

- Technical adequacy
- Impact on drawing numbers and revisions
- Impact on design review criteria. (The Design Process section of AGS-QAP-601 outlines when a formal design review should be convened).

5.5 Based on the QA Category classification, the CE shall forward the ECN and affected drawings (when appropriate) to the following individuals for review and approval.

- A3 (Minor) Cognizant Physicist (required for EP&S ECN's)  
Chief Mechanical and/or Electrical Engineer or designee
- A2 (Major) Division/Deputy Division Head
- A1 (Critical) Radiation Safety Committee Representative or designee  
Department Chairman/Deputy Department Chairman or designee

## **6.0 ECN Impact on Drawing Revisions**

6.1 It is the responsibility of the CE, when reviewing an ECN, to evaluate the impact of a drawing modification on all subsequent higher and/or lower assemblies/parts.

6.2 Based on the information supplied, the cognizant design room will increment the drawing(s) revision by one letter if an item is changed in such a manner that none of the conditions in paragraph 6.3 (1 through 5) occur.

6.3 A new drawing will be created when a part/item is changed in such a manner that one or more of the following conditions occur.

1. Performance or durability is affected to such an extent that superseded items must be discarded or modified for reasons of safety or malfunction.
2. Parts, subassemblies, or complete articles are changed to such an extent that the superseded (old article) and superseding (new article) items are not interchangeable.
3. When superseded parts (old parts) are limited to use in specific articles or models and the new parts are not so limited to use.
4. When a replaceable part or subassembly within an assembly is changed so that it is no longer interchangeable with its previous version, a new drawing number shall be assigned to the assembly which contains the new part/subassembly, if the new assembly is not interchangeable with previous revisions. All subsequent higher order assembly part numbers will also be changed, up to and including the level at which interchangeability is re-established.

5. An item has been altered, selected, or is a source control item.

6.4 If a new application is found for an existing part, the drawing number or revision shall be changed.

6.5 It is recommended that the design room annotate each superseded drawing with the

statement "This Drawing has been superseded by Drawing No. \_\_\_\_". The revision level of the superseded drawing shall not be incremented due to the addition of this statement in the field of the drawing.

**7.0 Incorporation/Distribution of Engineering Change Notices (ECN)**

7.1 The Design Group will incorporate the change into the drawing, referencing the ECN number in the revision section of the drawing.

7.1.1 For updated engineering drawing(s) with typed approvals, the designer will type in the appropriate names and dates on the respective approved drawing. At this point the release date is typed in, the file is transferred to the release directory and a copy is plotted for the drawing file. The hard copy of the drawing will, as a minimum, contain the signature/initials of the person who verified that the plotted drawing complies with the drawing file in the release directory.

7.2 If the changes specified on an ECN have not been incorporated into the original drawing, and hard copies of the drawing are released, the Design Room will either list all outstanding ECN's to the drawing in the "Outstanding ECN" section of the title box, annotate the drawing with the statement "This Drawing is not valid without ECN(s) \_\_", or indicate that an ECN is outstanding on the microfilm card. The revision level of the drawing shall not be incremented due to the listing of ECN information in the title box or the addition of the referenced statement in the field of the drawing.

Note: No more than two outstanding ECNs may accrue against any drawing without a revision being made to the document incorporating the changes.


7.3 The Design Group will maintain a file of approved ECN's.

7.4 To facilitate implementation of the ECN the CE should contact groups or individuals responsible for carrying out actions/dispositions required by the ECN.

7.5 The recipient of the revised/new drawing shall ensure that all drawings obsolete or superseded by the revision are removed from current files and/or workplaces, or are marked "Superseded" and are not utilized in processing material beyond the date the ECN was signed by the Chief ME/EE or designee.

Collider Accelerator  
Department

Title: Configuration Management.  
CAD-QAP-603  
Rev. A

 <small>BROOKHAVEN NATIONAL LABORATORY BROOKHAVEN SCIENCE ASSOCIATES</small>		SHEET 1 OF ___	
<b>AGS DEPARTMENT ENGINEERING CHANGE NOTICE</b>			
QA CATEGORY:    ⚡ A1 (CRITICAL)    ⚡ A2 (MAJOR)    ⚡ A3 (MINOR)			
DWG/SPEC No:		REVISION: FROM:      TO:	ECN No.
DWG/SPEC TITLE:			
NEXT ASSEMBLY (USED ON) No.			
DESCRIPTION AND REASON FOR CHANGE			
<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>			
Requested By _____		Date _____	
Cognizant Engineer _____		Date _____	
<b>REVIEW/APPROVAL</b>			
(A3) Cognizant Physicist _____		Date _____	
Chief EE/ME _____		Date _____	
(A2) Div Head/Deputy Div Head _____		Date _____	
(A1) Radiation Safety _____		Date _____	
Dept Head/Deputy Dept Head _____		Date _____	
ECN Incorporated By _____		Date _____	

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Figure 1

INSTRUCTIONS FOR COMPLETING THE ECN FORM

Any individual recognizing the need for a drawing or specification change may originate the ECN form.

QA Category - The requester shall check the proper QA category (A1-Critical, A2-Major, A3-Minor).

Drawing/Specification No. - The requester shall enter the drawing or specification number of the document to be changed.

Revision - The requester shall enter the current revision letter of the drawing or specification on the "From" line. The Design Group shall enter the next revision level on the "To" line at a later time (when the ECN is approved).

ECN No. - The Design Group shall enter the ECN number after receipt of the ECN from the requester. If the ECN is an Advance ECN, the letter "A" should precede the number. All sheets pertaining to the ECN will carry the same number. The Design Group shall record the necessary data in the ECN log.

Drawing/Specification Title - The requester shall enter the title of the drawing or the specification to be changed.

Next Assembly (Used On) No. - The Design Room shall enter the number of the next higher drawing as it appears in the next assembly block.

Description and Reason for Change - The requester shall enter a complete description of the change. Where complexity warrants, the narrative should be supplemented with a sketch. Reason for change will also be entered in this block. The point of effectivity for the change will also be entered in this section.

ECN Requested By - The requester shall enter his/her signature and the date.

Cognizant Engineer - The cognizant engineer shall enter his/her signature and the date. The cognizant engineer is responsible for the proper entry of all the previous elements.

Review/Approval - Each of the cognizant authorities shall review the ECN for completeness, technical content, technical accuracy, impact, and validity. If the reviewer concurs with the ECN as written, he/she will sign and date the form on the proper line. Based on the QA Category classification, the CE shall forward the ECN and affected drawings (when appropriate) to the following individuals for review and approval.

A3 (Minor)	Cognizant Physicist (required for Primary Area Enclosure changes) Chief Mechanical and/or Electrical Engineer or designee
A2 (Major)	Division/Deputy Division Head
A1 (Critical)	Radiation Safety Committee Representative Department Chairman/Deputy Department Chairman or designee

ECN Incorporated By - The person in the Design Group who incorporates the ECN into the drawing(s) or specification(s) shall sign and date the ECN form to signify that the change has been incorporated. That person shall also advance the revision level on the "To" line of the Revision block.